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Chapter Outline

GENETICS AND CHEMOTHERAPY

by

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1. Introduction to define problem: Example, clinical failure of sulfonamides in therapy of gonorrhea.
2. Background information on drugs. Theory of biological antagonism. (Appendix with chemical classification of antibiotics?)
3. Adaptations of individual organisms
 - A. Drug tolerance and addiction in mammals
 - B. Enzymatic adaptation in microorganisms(Both physiological and not heritable)
4. Individual variation (higher animals (and plants)) in response to drugs.
 - A. ? Ex. Rabbit/atropine esterase (single gene)
 - B. DDT resistance in insects (multiple genes)
5. Drug resistance in microbial populations [Content similar to 1953 review]
 - A. Pre- and post-adaptation theories and their experimental decision
 - B. Multi-step resistance
 - C. Physiology of resistance (mechanisms; cross-resistance; secondary effects)
6. Genetic effects of drugs [other than adaptation] (mutagenic; anti-mitotic; removal of cytoplasmic particles)
7. Specific examples of drug resistance in bacteria and other parasites. Laboratory and clinical studies
8. Resistance as a genetic marker (genetic analysis in microorganisms; mutation and recombination studies)
9. Genetic improvement of antibiotic production
10. Genetic theory and clinical practice in chemotherapy.
 - A. Correlation in lab. and in practice
 - B. Synergism and combined therapy
 - C. Future prospects in chemotherapy
(~~pharmacokinetics/pharmacodynamics~~) (can resistance be prevented or reversed? (cross-resistance; pathogenicity of resistant mutants; evolutionary trends in microbial populations; the strategy (vs. tactics) of chemotherapeutic practice.)

The book is intended primarily for ^{bacteriologists and} medical students and practitioners of chemotherapy who want a theoretical understanding of the drug-resistance they inevitably encounter in practice. However, resistance will also be stressed as a model of adaptation and evolution in microorganism.

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biological